SEQUENCE LISTING

<110> Dale, James Langham
     Echeverria, Santy Peraza

<120> BANANA RESISTANCE GENES AND USES THEREOF

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<141> 2006-10-31

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Gln Thr Leu Leu Asp Lys Ala Ser Asn Cys Ala Ile Gln Gln Leu Ala
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cgg cgc cgc ggc ctt cac gat gac ctg agg cgg ctg cgg acg tct ctg   144
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tat gac gcc gag gac tta ctg gag gag ttg gag tac caa gcc gcg aag   288
Tyr Asp Ala Glu Asp Leu Leu Glu Glu Leu Glu Tyr Gln Ala Ala Lys
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caa aag gtc gag cac cgg gga gac cag ata agc gac ctc ttt tct ttt   336
Gln Lys Val Glu His Arg Gly Asp Gln Ile Ser Asp Leu Phe Ser Phe
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Page 1

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Gly Thr Arg Leu Arg Glu Ile Gln Gly Lys Leu Cys Asn Ile Ala Ala
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gat atg atg gat gtc atg cag cta ttg gca ccc gat gat ggg ggg aga      480
Asp Met Met Asp Val Met Gln Leu Leu Ala Pro Asp Asp Gly Gly Arg
145             150             155             160

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Gln Phe Asp Trp Lys Val Val Arg Arg Glu Thr Ser Ser Phe Leu Thr
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gaa acc gtc gtg ttt ggt cgg gac caa gaa agg gag aaa gta gta gaa      576
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Cys Val Ser Asp Asn Phe Asn Val Lys Arg Leu Thr Lys Glu Ile Ile
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Val Leu Asp Asp Val Trp Ser Glu Asn Arg Asp Asp Trp Glu Arg Leu
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tgc gca cca cta agg ttt gca gca aga ggc agc aag gtt ata gtc aca      960
Cys Ala Pro Leu Arg Phe Ala Ala Arg Gly Ser Lys Val Ile Val Thr
305             310             315             320

act cga gac aca aag att gcc agc atc att ggc aca atg aag gaa att      1008
Thr Arg Asp Thr Lys Ile Ala Ser Ile Ile Gly Thr Met Lys Glu Ile
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tcg ctc gat ggt ctc cag gat gat gct tac tgg gag ctg ttc aag aaa      1056
Ser Leu Asp Gly Leu Gln Asp Asp Ala Tyr Trp Glu Leu Phe Lys Lys
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tgt gca ttt ggt tct gtg aac ccc cag gag cat cta gag ctc gag gtt      1104
Cys Ala Phe Gly Ser Val Asn Pro Gln Glu His Leu Glu Leu Glu Val
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aaa aca cta gga agc ttg ttg cgg ttg gat gtc agc caa gaa cac tgg      1200
Lys Thr Leu Gly Ser Leu Leu Arg Leu Asp Val Ser Gln Glu His Trp
385             390             395             400

aga act ata atg gaa agt gag gta tgg caa ctg cca caa gct gaa aat      1248
Arg Thr Ile Met Glu Ser Glu Val Trp Gln Leu Pro Gln Ala Glu Asn
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gaa ata ttg cct gtt cta tgg ctg agc tat caa cac ctt ccc gga cat      1296
Glu Ile Leu Pro Val Leu Trp Leu Ser Tyr Gln His Leu Pro Gly His
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ctt aga cag tgt ttc gct ttt tgc gct gtg ttt cac aaa gat tat tta      1344
Leu Arg Gln Cys Phe Ala Phe Cys Ala Val Phe His Lys Asp Tyr Leu
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Phe Tyr Lys His Glu Leu Ile Gln Thr Trp Ile Ala Glu Gly Phe Ile
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gca cat caa gga aac aag agg atg gaa gat gtc gga agc agc tac ttc      1440
Ala His Gln Gly Asn Lys Arg Met Glu Asp Val Gly Ser Ser Tyr Phe
465             470             475             480

cat gag ctt gtt aat agg tct ttc ttt cag gaa tct cgg tgg aga ggg      1488
His Glu Leu Val Asn Arg Ser Phe Phe Gln Glu Ser Arg Trp Arg Gly
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cga tat gtg atg cat gac ctc ata cac gat ctt gcc caa ttt ata tca      1536
Arg Tyr Val Met His Asp Leu Ile His Asp Leu Ala Gln Phe Ile Ser
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Val Gly Glu Cys His Arg Ile Asp Asp Asp Lys Ser Lys Glu Thr Pro
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agt acg act cgt cat cta tca gta gca tta act gag caa atg aag ttg      1632
Ser Thr Thr Arg His Leu Ser Val Ala Leu Thr Glu Gln Met Lys Leu
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Val Asp Phe Ser Gly Tyr Asn Lys Leu Arg Thr Leu Met Ile Asn Asn
545             550             555             560

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Gln Arg Asn Gln Tyr Pro Tyr Met Thr Lys Val Asn Ser Cys Leu Leu
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cct cat agc ttg ttc aaa aga ctg aaa aga atc cat gtt tta gtt ttg      1776
Pro His Ser Leu Phe Lys Arg Leu Lys Arg Ile His Val Leu Val Leu
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Gln Lys Cys Gly Met Lys Glu Leu Pro Asp Ile Ile Gly Asp Leu Ile
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caa ctt cgg tac ctt gac ata tcc tac aat gct tgc att cag agg ttg      1872
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ccc gag tca ttg tgc gac ctt tac aat ctg caa gca ctg agg cta tgg    1920
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ggc tgt caa tta cgg agt ttc cca caa ggc atg agc aag ctg atc aac    1968
Gly Cys Gln Leu Arg Ser Phe Pro Gln Gly Met Ser Lys Leu Ile Asn
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ttg agg caa ctt cgt gta gaa gat gag ata att tcc aag ata tat gag    2016
Leu Arg Gln Leu Arg Val Glu Asp Glu Ile Ile Ser Lys Ile Tyr Glu
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gtt ggg aag ctg att tct ctg caa gaa ttg tct gca ttc aaa gtg cta    2064
Val Gly Lys Leu Ile Ser Leu Gln Glu Leu Ser Ala Phe Lys Val Leu
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aat aat cat gga aac aaa ctt gca gaa cta agt ggt ttg aca caa ctc    2112
Asn Asn His Gly Asn Lys Leu Ala Glu Leu Ser Gly Leu Thr Gln Leu
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cgc agc act cta cga att aca aat ctt gaa aat gta ggg agt aaa gaa    2160
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Glu Ala Ser Lys Ala Lys Leu His Arg Lys Gln Tyr Leu Glu Ala Leu
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gag tta gag tgg gca gct ggc cag gtt tcc agc ttg gag cat gag tta    2256
Glu Leu Glu Trp Ala Ala Gly Gln Val Ser Ser Leu Glu His Glu Leu
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ctt gtc tcg gag gaa gta ctt tta ggt ctc caa cca cat cac ttc ctc    2304
Leu Val Ser Glu Glu Val Leu Leu Gly Leu Gln Pro His His Phe Leu
            755                 760                 765

aaa agt ttg aca atc aga ggg tac agt ggt gca aca gta ccc agt tgg    2352
Lys Ser Leu Thr Ile Arg Gly Tyr Ser Gly Ala Thr Val Pro Ser Trp
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ctg gat gtg aaa atg cta ccg aac ttg gga act ctt aaa cta gag aac    2400
Leu Asp Val Lys Met Leu Pro Asn Leu Gly Thr Leu Lys Leu Glu Asn
785                 790                 795                 800

tgt aca aga ctg gag ggt ctt tca tat att gga caa ctg cca cat ctc    2448
Cys Thr Arg Leu Glu Gly Leu Ser Tyr Ile Gly Gln Leu Pro His Leu
                    805                 810                 815

aag gtc ctt cat atg aag aga atg cct gtg gtg aaa caa atg agt cat    2496
Lys Val Leu His Met Lys Arg Met Pro Val Val Lys Gln Met Ser His
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gaa tta tgt ggc tgt acg aaa agc aag ttg ttc cct agg cta gaa gag    2544
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tta gta ctg gag gat atg cca aca ttg aaa gaa ttc ccg aat ctt gca    2592
Leu Val Leu Glu Asp Met Pro Thr Leu Lys Glu Phe Pro Asn Leu Ala
            850                 855                 860

caa ctt cct tgt ctc aag att att cac atg aag aac atg ttt gca gta    2640
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Gln Leu Pro Cys Leu Lys Ile Ile His Met Lys Asn Met Phe Ala Val
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aaa cat ata ggt cgt gaa tta tat ggt gat ata gag agc aat tgt ttt   2688
Lys His Ile Gly Arg Glu Leu Tyr Gly Asp Ile Glu Ser Asn Cys Phe
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cta tca tta gaa gag ctt gtg ctg cag gac atg ctg aca ttg gag gaa   2736
Leu Ser Leu Glu Glu Leu Val Leu Gln Asp Met Leu Thr Leu Glu Glu
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ctc cca aat ctt gga caa ctt cca cat ctt aag gtt att cac atg aag   2784
Leu Pro Asn Leu Gly Gln Leu Pro His Leu Lys Val Ile His Met Lys
          915   920   925

aac atg tct gca ctg aaa ctt ata ggt cgt gaa tta tgt gat tct aga   2832
Asn Met Ser Ala Leu Lys Leu Ile Gly Arg Glu Leu Cys Asp Ser Arg
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gag aaa att tgg ttt cct agg cta gaa gtg cta gtg ctg aag aac atg   2880
Glu Lys Ile Trp Phe Pro Arg Leu Glu Val Leu Val Leu Lys Asn Met
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Leu Ala Leu Glu Glu Leu Pro Ser Leu Asp Asn Phe Arg Val Ser Arg
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Phe Phe Ala Ser Ser Val Glu Val Gly His Gly Leu Phe Ser Ala Thr
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Arg Asn Lys Trp Phe Pro Arg Leu Glu Glu Leu Glu Ile Lys Gly Met
          995   1000   1005

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Leu Thr Phe Glu Glu Leu His Ser Leu Glu Lys Leu Pro Cys Leu
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aag gtt ttc cgc atc aag gga ttg cca gca gtg aaa aag ata ggc   3114
Lys Val Phe Arg Ile Lys Gly Leu Pro Ala Val Lys Lys Ile Gly
      1025   1030   1035

cat gga tta ttt gat tct acc tgt cag aga gag tgt ttt cca agg   3159
His Gly Leu Phe Asp Ser Thr Cys Gln Arg Glu Cys Phe Pro Arg
      1040   1045   1050

ttg gaa gat ctc gta tta agc gac atg cca gca tgg gaa gag tgg   3204
Leu Glu Asp Leu Val Leu Ser Asp Met Pro Ala Trp Glu Glu Trp
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tcg tgg gct gaa agg gag gag tta ttt tcc tgc ttg tgt aga ctt   3249
Ser Trp Ala Glu Arg Glu Glu Leu Phe Ser Cys Leu Cys Arg Leu
      1070   1075   1080

aaa att gaa caa tgc ccc aaa ctt aaa tgc ttg ctt ccc atc cct   3294
Lys Ile Glu Gln Cys Pro Lys Leu Lys Cys Leu Leu Pro Ile Pro
      1085   1090   1095

cat tct ctc ata aaa ctt gaa tta tgg caa gtt ggg ctg aca gga   3339
His Ser Leu Ile Lys Leu Glu Leu Trp Gln Val Gly Leu Thr Gly
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Thr Ala Ser Leu Ser Leu Leu His Ile Ile Lys Cys Pro Asn Leu
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aga aat ctg gga gaa ggg ttg cta tca aac cac ctg cca cat atc        3474
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Arg Asn Cys Pro Lys Leu Met Ser Met Thr Gln Cys Glu Glu Asn
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Cys Gly Asn Leu Gly Lys Ser Leu Pro Gly Cys Leu His Asn Leu
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Leu Leu Glu Leu Ser Val Asp Lys Thr Ala Leu Leu Lys Leu Ser
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Lys  Asn  Leu  Gln  Ser  Leu  Pro  Thr  Glu  Leu  His  Thr  Leu  Pro  Ser
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Leu  His  Ala  Leu  Val  Val  Ser  Asp  Cys  Pro  Gln  Ile  Gln  Ser  Leu
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Ser Leu Ser Thr Ala Ser Glu Trp Leu Gly Ala Asp Gly Asp Asp Ala
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Gly Thr Arg Leu Arg Glu Ile Gln Gly Lys Leu Cys Asn Ile Ala Ala
        130                 135                 140
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145                 150                 155                 160
Gln Phe Asp Trp Lys Val Val Arg Arg Glu Thr Ser Ser Phe Leu Thr
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Glu Thr Val Val Phe Gly Arg Asp Gln Glu Arg Glu Lys Val Val Glu
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Leu Leu Leu Asp Ser Gly Ser Gly Asn Ser Ser Phe Ser Val Leu Pro
            195                 200                 205
Leu Val Gly Ile Gly Gly Val Gly Lys Thr Thr Leu Ala Gln Leu Val
     210                 215                 220
Tyr Asn Asp Asn Arg Val Gly Asn Tyr Phe His Leu Lys Val Trp Val
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Cys Val Ser Asp Asn Phe Asn Val Lys Arg Leu Thr Lys Glu Ile Ile
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Glu Ser Ala Thr Lys Val Glu Gln Ser Asp Lys Leu Asn Leu Asp Thr
                260                 265                 270
Leu Gln Gln Ile Leu Lys Glu Lys Ile Ala Ser Glu Arg Phe Leu Leu
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305                 310                 315                 320
Thr Arg Asp Thr Lys Ile Ala Ser Ile Ile Gly Thr Met Lys Glu Ile
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Ser Leu Asp Gly Leu Gln Asp Asp Ala Tyr Trp Glu Leu Phe Lys Lys
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Cys Ala Phe Gly Ser Val Asn Pro Gln Glu His Leu Glu Leu Glu Val
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Ile Gly Arg Lys Ile Ala Gly Lys Leu Lys Gly Ser Pro Leu Ala Ala
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Lys Thr Leu Gly Ser Leu Leu Arg Leu Asp Val Ser Gln Glu His Trp
385                 390                 395                 400
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Glu Ile Leu Pro Val Leu Trp Leu Ser Tyr Gln His Leu Pro Gly His
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Val Gly Glu Cys His Arg Ile Asp Asp Asp Lys Ser Lys Glu Thr Pro
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Gly Cys Gln Leu Arg Ser Phe Pro Gln Gly Met Ser Lys Leu Ile Asn
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Arg Ser Thr Leu Arg Ile Thr Asn Leu Glu Asn Val Gly Ser Lys Glu
705                 710                 715                 720
Glu Ala Ser Lys Ala Lys Leu His Arg Lys Gln Tyr Leu Glu Ala Leu
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Glu Leu Glu Trp Ala Ala Gly Gln Val Ser Ser Leu Glu His Glu Leu
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Lys Ser Leu Thr Ile Arg Gly Tyr Ser Gly Ala Thr Val Pro Ser Trp
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Leu Asp Val Lys Met Leu Pro Asn Leu Gly Thr Leu Lys Leu Glu Asn
785             790             795             800
Cys Thr Arg Leu Glu Gly Leu Ser Tyr Ile Gly Gln Leu Pro His Leu
            805             810             815
Lys Val Leu His Met Lys Arg Met Pro Val Val Lys Gln Met Ser His
            820             825             830
Glu Leu Cys Gly Cys Thr Lys Ser Lys Leu Phe Pro Arg Leu Glu Glu
        835             840             845
Leu Val Leu Glu Asp Met Pro Thr Leu Lys Glu Phe Pro Asn Leu Ala
    850             855             860
Gln Leu Pro Cys Leu Lys Ile Ile His Met Lys Asn Met Phe Ala Val
865             870             875             880
Lys His Ile Gly Arg Glu Leu Tyr Gly Asp Ile Glu Ser Asn Cys Phe
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Leu Ser Leu Glu Glu Leu Val Leu Gln Asp Met Leu Thr Leu Glu Glu
        900             905             910
Leu Pro Asn Leu Gly Gln Leu Pro His Leu Lys Val Ile His Met Lys
        915             920             925
Asn Met Ser Ala Leu Lys Leu Ile Gly Arg Glu Leu Cys Asp Ser Arg
    930             935             940
Glu Lys Ile Trp Phe Pro Arg Leu Glu Val Leu Val Leu Lys Asn Met
945             950             955             960
Leu Ala Leu Glu Glu Leu Pro Ser Leu Asp Asn Phe Arg Val Ser Arg
            965             970             975
Phe Phe Ala Ser Ser Val Glu Val Gly His Gly Leu Phe Ser Ala Thr
            980             985             990
Arg Asn Lys Trp Phe Pro Arg Leu Glu Glu Leu Glu Ile Lys Gly Met
        995             1000            1005
Leu Thr Phe Glu Glu Leu His Ser Leu Glu Lys Leu Pro Cys Leu Lys
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Val Phe Arg Ile Lys Gly Leu Pro Ala Val Lys Lys Ile Gly His Gly
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Leu Phe Asp Ser Thr Cys Gln Arg Glu Cys Phe Pro Arg Leu Glu Asp
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Leu Val Leu Ser Asp Met Pro Ala Trp Glu Glu Trp Ser Trp Ala Glu
        1060            1065            1070
Arg Glu Glu Leu Phe Ser Cys Leu Cys Arg Leu Lys Ile Glu Gln Cys
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Pro Lys Leu Lys Cys Leu Leu Pro Ile Pro His Ser Leu Ile Lys Leu
    1090            1095            1100
Glu Leu Trp Gln Val Gly Leu Thr Gly Leu Pro Gly Leu Cys Lys Gly
1105            1110            1115            1120
Ile Gly Gly Gly Ser Ser Thr Arg Thr Ala Ser Leu Ser Leu Leu His
            1125            1130            1135
Ile Ile Lys Cys Pro Asn Leu Arg Asn Leu Gly Glu Gly Leu Leu Ser
            1140            1145            1150
Asn His Leu Pro His Ile Asn Ala Ile Arg Ile Trp Glu Cys Ala Glu
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Leu Leu Trp Leu Pro Val Lys Arg Phe Arg Glu Phe Thr Thr Leu Glu
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Asn Leu Ser Ile Arg Asn Cys Pro Lys Leu Met Ser Met Thr Gln Cys
1185            1190            1195            1200
Glu Glu Asn Asp Leu Leu Leu Pro Pro Leu Ile Lys Ala Leu Glu Leu
            1205            1210            1215
Gly Asp Cys Gly Asn Leu Gly Lys Ser Leu Pro Gly Cys Leu His Asn
        1220            1225            1230
Leu Ser Ser Leu Thr Gln Leu Ala Ile Ser Asn Cys Pro Tyr Met Val
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Page 9

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              1235                1240                1245
Ser Leu Pro Arg Glu Val Met Leu His Leu Lys Glu Leu Gly Thr Val
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Arg Ile Glu Asn Cys Asp Gly Leu Gly Ser Ile Glu Gly Leu Gln Val
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Leu Lys Ser Leu Lys Arg Leu Ala Ile Ile Gly Cys Pro Arg Leu Leu
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Leu Asn Glu Gly Asp Glu Gln Gly Glu Val Leu Ser Leu Leu Glu Leu
          1300                1305                1310
Ser Val Asp Lys Thr Ala Leu Leu Lys Leu Ser Leu Ile Lys Asn Thr
          1315                1320                1325
Leu Pro Phe Ile His Ser Leu Arg Ile Ile Trp Ser Pro Gln Lys Val
          1330                1335                1340
Met Phe Asp Leu Glu Glu Gln Glu Leu Val His Ser Leu Thr Ala Leu
1345                1350                1355                1360
Arg Arg Leu Glu Phe Phe Arg Cys Lys Asn Leu Gln Ser Leu Pro Thr
               1365                1370                1375
Glu Leu His Thr Leu Pro Ser Leu His Ala Leu Val Val Ser Asp Cys
          1380                1385                1390
Pro Gln Ile Gln Ser Leu Pro Glu Lys Gly Leu Pro Thr Leu Leu Thr
          1395                1400                1405
Asp Leu Gly Phe Asp His Cys His Pro Val Leu Thr Ala Gln Leu Glu
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Lys His Leu Ala Glu Met Lys Ser Ser Gly Arg Phe His Pro Val Tyr
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gaa atc ttt aac cgg tcc atc aat ttg atc gtc gcg gaa ctc cgg ttg      96
Glu Ile Phe Asn Arg Ser Ile Asn Leu Ile Val Ala Glu Leu Arg Leu
               20                  25                  30

cag ttg aat gcg aga gcc gag ctg aac aat ctg cag aga aca cta ttg     144
Gln Leu Asn Ala Arg Ala Glu Leu Asn Asn Leu Gln Arg Thr Leu Leu
          35                  40                  45

agg act cac tct ctg ctc gag gag gca aag gcg agg cgg atg act gac     192
Arg Thr His Ser Leu Leu Glu Glu Ala Lys Ala Arg Arg Met Thr Asp
     50                  55                  60

aag tct ctc gtg ctg tgg ctg atg gag ctc aag gaa tgg gcc tac gac     240
Lys Ser Leu Val Leu Trp Leu Met Glu Leu Lys Glu Trp Ala Tyr Asp
65                  70                  75                  80

gcc gac gac atc ctc gac gag tac gag gcc gca gca atc cga ctg aag     288
Ala Asp Asp Ile Leu Asp Glu Tyr Glu Ala Ala Ala Ile Arg Leu Lys
               85                  90                  95
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gta aca cgc tcg acc ttc aaa cgt ctt atc gat cat gtg att ata aat        336
Val Thr Arg Ser Thr Phe Lys Arg Leu Ile Asp His Val Ile Ile Asn
        100                 105                 110

gtt cca tta gcg cac aaa gta gca gac atc agg aaa agg ttg aac ggg        384
Val Pro Leu Ala His Lys Val Ala Asp Ile Arg Lys Arg Leu Asn Gly
        115                 120                 125

gtc act ctt gag agg gag cta aat ctg ggt gcg ctg gaa ggg tcg cag        432
Val Thr Leu Glu Arg Glu Leu Asn Leu Gly Ala Leu Glu Gly Ser Gln
    130                 135                 140

ccg ctt gat tcc acg aaa aga ggt gtg acc act tct ctt ctg act gaa        480
Pro Leu Asp Ser Thr Lys Arg Gly Val Thr Thr Ser Leu Leu Thr Glu
145                 150                 155                 160

tct tgt att gtc ggg cga gct caa gat aag gag aat ttg att cgg ttg        528
Ser Cys Ile Val Gly Arg Ala Gln Asp Lys Glu Asn Leu Ile Arg Leu
                165                 170                 175

ctg ttg gag ccc agc gat ggg gcg gtt cct gtt gtt cct ata gtt gga        576
Leu Leu Glu Pro Ser Asp Gly Ala Val Pro Val Val Pro Ile Val Gly
                180                 185                 190

tta gga ggg gca ggg aag acg act ctg tct cag ctt atc ttt aat gac        624
Leu Gly Gly Ala Gly Lys Thr Thr Leu Ser Gln Leu Ile Phe Asn Asp
            195                 200                 205

aag aga gtg gag gag cat ttc cca ttg aga atg tgg gtg tgt gtg tct        672
Lys Arg Val Glu Glu His Phe Pro Leu Arg Met Trp Val Cys Val Ser
    210                 215                 220

gac gat ttt gat gtg aag aga att act aga gag atc aca gag tac gcc        720
Asp Asp Phe Asp Val Lys Arg Ile Thr Arg Glu Ile Thr Glu Tyr Ala
225                 230                 235                 240

acc aac gga agg ttc atg gat ctc acc aac ttg aat atg ctt caa gtt        768
Thr Asn Gly Arg Phe Met Asp Leu Thr Asn Leu Asn Met Leu Gln Val
                245                 250                 255

aat ctg aaa gag gag ata agg ggg acg aca ttt ttg ctt gtg ctg gat        816
Asn Leu Lys Glu Glu Ile Arg Gly Thr Thr Phe Leu Leu Val Leu Asp
                260                 265                 270

gat gtg tgg aac gaa gac ccc gtg aag tgg gaa agc ctg tta gcc cca        864
Asp Val Trp Asn Glu Asp Pro Val Lys Trp Glu Ser Leu Leu Ala Pro
            275                 280                 285

tta gat gcc gga gga cgg gga agc gtg gtc att gtg acg aca cag agc        912
Leu Asp Ala Gly Gly Arg Gly Ser Val Val Ile Val Thr Thr Gln Ser
    290                 295                 300

aaa aag gtc gcc gat gtc acc ggc acg atg gag cca tac gtt ctc gag        960
Lys Lys Val Ala Asp Val Thr Gly Thr Met Glu Pro Tyr Val Leu Glu
305                 310                 315                 320

gag tta acg gag gat gac agt tgg tca ctc atc gag agt cac tcc ttc       1008
Glu Leu Thr Glu Asp Asp Ser Trp Ser Leu Ile Glu Ser His Ser Phe
                325                 330                 335

agg gag gcg agc tgc tct agt aca aat cct aga atg gaa gag atc ggg       1056
Arg Glu Ala Ser Cys Ser Ser Thr Asn Pro Arg Met Glu Glu Ile Gly
            340                 345                 350
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agg aag ata gcc aag aag atc agt ggc cta cct tac gga gca aca gca      1104
Arg Lys Ile Ala Lys Lys Ile Ser Gly Leu Pro Tyr Gly Ala Thr Ala
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atg ggg aga tat cta aga tct aag cac gga gaa agc agc tgg aga gaa      1152
Met Gly Arg Tyr Leu Arg Ser Lys His Gly Glu Ser Ser Trp Arg Glu
        370             375             380

gtc ttg gaa act gag act tgg gag atg cca ccg gct gca agt gat gtg      1200
Val Leu Glu Thr Glu Thr Trp Glu Met Pro Pro Ala Ala Ser Asp Val
385             390             395             400

tta tcc gct cta agg aga agt tac gac aat cta ccc cct cag ctg aag      1248
Leu Ser Ala Leu Arg Arg Ser Tyr Asp Asn Leu Pro Pro Gln Leu Lys
                405             410             415

ctc tgt ttt gcc ttc tgt gct ctg ttt aca aag ggc tac agg ttt cga      1296
Leu Cys Phe Ala Phe Cys Ala Leu Phe Thr Lys Gly Tyr Arg Phe Arg
            420             425             430

aag gat aca ctg atc cac atg tgg ata gct caa aat ttg att caa tca      1344
Lys Asp Thr Leu Ile His Met Trp Ile Ala Gln Asn Leu Ile Gln Ser
        435             440             445

aca gag tcg aaa aga tcg gag gac atg gca gaa gaa tgc ttt gat gat      1392
Thr Glu Ser Lys Arg Ser Glu Asp Met Ala Glu Glu Cys Phe Asp Asp
        450             455             460

ttg gtg tgc aga ttc ttc ttt cgg tac tcc tgg ggc aac tat gtg atg      1440
Leu Val Cys Arg Phe Phe Phe Arg Tyr Ser Trp Gly Asn Tyr Val Met
465             470             475             480

aat gac tca gtc cat gac ctc gct cga tgg gtt tca ttg gat gaa tat      1488
Asn Asp Ser Val His Asp Leu Ala Arg Trp Val Ser Leu Asp Glu Tyr
                485             490             495

ttt cga gca gat gaa gac tca cca ttg cat att tca aag cca att cgt      1536
Phe Arg Ala Asp Glu Asp Ser Pro Leu His Ile Ser Lys Pro Ile Arg
                500             505             510

cat ttg tca tgg tgc agt gaa aga ata acc aat gtt ctt gag gat aat      1584
His Leu Ser Trp Cys Ser Glu Arg Ile Thr Asn Val Leu Glu Asp Asn
            515             520             525

aac act ggt gga gat gct gtc aat ccg ctc agc agt ttg cgc act ctc      1632
Asn Thr Gly Gly Asp Ala Val Asn Pro Leu Ser Ser Leu Arg Thr Leu
        530             535             540

ctt ttc tta ggc caa tct gag ttc cgg tcg tat cat ctt ctt gat aga      1680
Leu Phe Leu Gly Gln Ser Glu Phe Arg Ser Tyr His Leu Leu Asp Arg
545             550             555             560

atg ttc agg atg ttg agc cga atc cgt gtt ttg gat ttc agc aac tgc      1728
Met Phe Arg Met Leu Ser Arg Ile Arg Val Leu Asp Phe Ser Asn Cys
                565             570             575

gtc ata aga aat ttg cct tct tcg gtt gga aat ctg aaa cat ctg cgt      1776
Val Ile Arg Asn Leu Pro Ser Ser Val Gly Asn Leu Lys His Leu Arg
        580             585             590

tac ctg ggc ctg tct aat acg aga att caa agg ttg ccg gag tct gta      1824
Tyr Leu Gly Leu Ser Asn Thr Arg Ile Gln Arg Leu Pro Glu Ser Val
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                595                       600                        605

aca cgt ctt tgc ctc ctt cag aca ttg cta cta gag ggc tgt gaa ctg      1872
Thr Arg Leu Cys Leu Leu Gln Thr Leu Leu Leu Glu Gly Cys Glu Leu
    610                   615                   620

tgc agg tta cca aga agc atg agc agg ctc gtc aaa ctg agg cag ctc      1920
Cys Arg Leu Pro Arg Ser Met Ser Arg Leu Val Lys Leu Arg Gln Leu
625                   630                   635                   640

aaa gca aat cca gat gta att gcc gac ata gcc aaa gtc ggg aga ttg      1968
Lys Ala Asn Pro Asp Val Ile Ala Asp Ile Ala Lys Val Gly Arg Leu
                  645                   650                   655

atc gaa ctt caa gag ctg aaa gcc tat aat gtt gac aag aaa aaa gga      2016
Ile Glu Leu Gln Glu Leu Lys Ala Tyr Asn Val Asp Lys Lys Lys Gly
              660                   665                   670

cat ggg att gca gag cta agt gca atg aat cag ctt cac ggt gat ctt      2064
His Gly Ile Ala Glu Leu Ser Ala Met Asn Gln Leu His Gly Asp Leu
              675                   680                   685

tcc att aga aac ctt caa aat gta gag aaa acg cga gag tct cgg aag      2112
Ser Ile Arg Asn Leu Gln Asn Val Glu Lys Thr Arg Glu Ser Arg Lys
    690                   695                   700

gcg agg ttg gac gag aaa cag aag ctt aag ctc ttg gat ctg cga tgg      2160
Ala Arg Leu Asp Glu Lys Gln Lys Leu Lys Leu Leu Asp Leu Arg Trp
705                   710                   715                   720

gct gac ggt agg ggt gcc gga gaa tgt gat cgt gac agg aaa gtt ctt      2208
Ala Asp Gly Arg Gly Ala Gly Glu Cys Asp Arg Asp Arg Lys Val Leu
                  725                   730                   735

aaa ggc ctc cga cca cat cca aac ctg aga gaa ttg agt atc aaa tac      2256
Lys Gly Leu Arg Pro His Pro Asn Leu Arg Glu Leu Ser Ile Lys Tyr
              740                   745                   750

tac gga ggc act tca tct ccg agt tgg atg acg gat cag tat ctg ccc      2304
Tyr Gly Gly Thr Ser Ser Pro Ser Trp Met Thr Asp Gln Tyr Leu Pro
              755                   760                   765

aac atg gaa acg att cgc ctg cgt agc tgc gca agg ttg acg gaa ctc      2352
Asn Met Glu Thr Ile Arg Leu Arg Ser Cys Ala Arg Leu Thr Glu Leu
    770                   775                   780

cca tgt ctc ggt cag ctg cat atc ctt aga cat ttg cac atc gat ggg      2400
Pro Cys Leu Gly Gln Leu His Ile Leu Arg His Leu His Ile Asp Gly
785                   790                   795                   800

atg tcc caa gtg aga caa att aat ctg caa ttt tat ggc acc gga gaa      2448
Met Ser Gln Val Arg Gln Ile Asn Leu Gln Phe Tyr Gly Thr Gly Glu
                  805                   810                   815

gtt tca ggt ttt cca ttg ctg gag ctc ctg aac ata cgt cgc atg ccc      2496
Val Ser Gly Phe Pro Leu Leu Glu Leu Leu Asn Ile Arg Arg Met Pro
                  820                   825                   830

agt ctg gag gaa tgg tcg gaa cca cgg aga aac tgt tgc tac ttc cct      2544
Ser Leu Glu Glu Trp Ser Glu Pro Arg Arg Asn Cys Cys Tyr Phe Pro
              835                   840                   845

cgc ctc cat aaa ctg ctg atc gag gat tgt ccc agg ctc agg aat ctg      2592
Arg Leu His Lys Leu Leu Ile Glu Asp Cys Pro Arg Leu Arg Asn Leu
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Arg Leu His Lys Leu Leu Ile Glu Asp Cys Pro Arg Leu Arg Asn Leu
850   855   860

ccc tcc ctc cca cca aca ctg gaa gaa cta agg ata tca aga aca gga   2640
Pro Ser Leu Pro Pro Thr Leu Glu Glu Leu Arg Ile Ser Arg Thr Gly
865   870   875   880

cta gtt gat ctt cca gga ttc cat gga aac ggt gat gtg acg acg aat   2688
Leu Val Asp Leu Pro Gly Phe His Gly Asn Gly Asp Val Thr Thr Asn
                    885   890   895

gtt tcc ctt tct tct ttg cat gtt tcg gag tgt cga gaa ctg aga tcc   2736
Val Ser Leu Ser Ser Leu His Val Ser Glu Cys Arg Glu Leu Arg Ser
              900   905   910

cta agc gaa gga ttg ttg cag cac aac ctc gtc gcc ctc aag aca gcg   2784
Leu Ser Glu Gly Leu Leu Gln His Asn Leu Val Ala Leu Lys Thr Ala
          915   920   925

gca ttt acc gat tgt gat tct ctt gag ttt ttg ccg gcg gaa gga ttc   2832
Ala Phe Thr Asp Cys Asp Ser Leu Glu Phe Leu Pro Ala Glu Gly Phe
      930   935   940

aga aca gcc att tca ctt gaa tca ttg ata atg act aat tgt cca ctg   2880
Arg Thr Ala Ile Ser Leu Glu Ser Leu Ile Met Thr Asn Cys Pro Leu
945   950   955   960

cct tgc agt ttt ctt ttg cct tcc tct ctc gag cat cta aag ttg cag   2928
Pro Cys Ser Phe Leu Leu Pro Ser Ser Leu Glu His Leu Lys Leu Gln
              965   970   975

cca tgc ctc tat cca aac aac aat gag gat tca ctg tca aca tgc ttc   2976
Pro Cys Leu Tyr Pro Asn Asn Asn Glu Asp Ser Leu Ser Thr Cys Phe
              980   985   990

gag aac ctc aca tct ctt tcc ttc ttg gac atc aaa gat tgt cca aat   3024
Glu Asn Leu Thr Ser Leu Ser Phe Leu Asp Ile Lys Asp Cys Pro Asn
              995   1000   1005

ctg tca tca ttt cca ccg ggt cct cta tgt cag cta tca gca ctc   3069
Leu Ser Ser Phe Pro Pro Gly Pro Leu Cys Gln Leu Ser Ala Leu
    1010   1015   1020

caa cat ttg tcc ctc gtc aat tgc cag agg cta caa tct att ggc   3114
Gln His Leu Ser Leu Val Asn Cys Gln Arg Leu Gln Ser Ile Gly
    1025   1030   1035

ttc cag gca ctc acc tcc ctc gaa agc ttg aca att cag aac tgc   3159
Phe Gln Ala Leu Thr Ser Leu Glu Ser Leu Thr Ile Gln Asn Cys
    1040   1045   1050

cct cgc ctc acc atg tca cac agt ttg gtt gag gtg aat aac tct   3204
Pro Arg Leu Thr Met Ser His Ser Leu Val Glu Val Asn Asn Ser
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tcc gat aca ggg ctc gcg ttt aat atc act cga tgg atg cgc aga   3249
Ser Asp Thr Gly Leu Ala Phe Asn Ile Thr Arg Trp Met Arg Arg
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cga aca ggt gac gac ggc ttg atg ctc aga cac cga gca caa aat   3294
Arg Thr Gly Asp Asp Gly Leu Met Leu Arg His Arg Ala Gln Asn
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    1100             1105              1110

ttt cta aag atc tgc cag tgt  cca caa ctc gta acc  ttc acc ggc         3384
Phe Leu Lys Ile Cys Gln Cys  Pro Gln Leu Val Thr  Phe Thr Gly
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gaa gag gaa gag aag tgg aga  aac ctt act tct ctt  caa att ctg         3429
Glu Glu Glu Glu Lys Trp Arg  Asn Leu Thr Ser Leu  Gln Ile Leu
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cac atc gtt gat tgt cca aac  ctg gag gta ctg cct  gca aac ttg         3474
His Ile Val Asp Cys Pro Asn  Leu Glu Val Leu Pro  Ala Asn Leu
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caa agc ctc tgc tcc ctc agc  acc ttg tac atc gtc  aga tgc cca         3519
Gln Ser Leu Cys Ser Leu Ser  Thr Leu Tyr Ile Val  Arg Cys Pro
    1160             1165              1170

aga atc cat gcg ttt cct ccc  gga ggt gtc agc atg  tcc ctg gca         3564
Arg Ile His Ala Phe Pro Pro  Gly Gly Val Ser Met  Ser Leu Ala
    1175             1180              1185

cat ttg gtc atc cat gaa tgc  cct cag ctg tgt cag  cga tgt gat         3609
His Leu Val Ile His Glu Cys  Pro Gln Leu Cys Gln  Arg Cys Asp
    1190             1195              1200

cca ccg gga ggt gat gat tgg  ccc tta ata gct aat  gta cca aga         3654
Pro Pro Gly Gly Asp Asp Trp  Pro Leu Ile Ala Asn  Val Pro Arg
    1205             1210              1215

ata tgt ctt gga agg act cat  cca tgt cgc tgt agc  acc acc tga         3699
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Gln Leu Asn Ala Arg Ala Glu Leu Asn Asn Leu Gln Arg Thr Leu Leu
        35                  40                  45
Arg Thr His Ser Leu Leu Glu Glu Ala Lys Ala Arg Arg Met Thr Asp
    50                  55                  60
Lys Ser Leu Val Leu Trp Leu Met Glu Leu Lys Glu Trp Ala Tyr Asp
65                  70                  75                  80
Ala Asp Asp Ile Leu Asp Glu Tyr Glu Ala Ala Ala Ile Arg Leu Lys
                85                  90                  95
Val Thr Arg Ser Thr Phe Lys Arg Leu Ile Asp His Val Ile Ile Asn
            100                 105                 110
Val Pro Leu Ala His Lys Val Ala Asp Ile Arg Lys Arg Leu Asn Gly
        115                 120                 125
Val Thr Leu Glu Arg Glu Leu Asn Leu Gly Ala Leu Glu Gly Ser Gln
    130                 135                 140
Pro Leu Asp Ser Thr Lys Arg Gly Val Thr Thr Ser Leu Leu Thr Glu
145                 150                 155                 160
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Ser Cys Ile Val Gly Arg Ala Gln Asp Lys Glu Asn Leu Ile Arg Leu
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Leu Leu Glu Pro Ser Asp Gly Ala Val Pro Val Val Pro Ile Val Gly
            180   185   190
Leu Gly Gly Ala Gly Lys Thr Thr Leu Ser Gln Leu Ile Phe Asn Asp
        195   200   205
Lys Arg Val Glu Glu His Phe Pro Leu Arg Met Trp Val Cys Val Ser
    210   215   220
Asp Asp Phe Asp Val Lys Arg Ile Thr Arg Glu Ile Thr Glu Tyr Ala
225   230   235   240
Thr Asn Gly Arg Phe Met Asp Leu Thr Asn Leu Asn Met Leu Gln Val
                245   250   255
Asn Leu Lys Glu Glu Ile Arg Gly Thr Thr Phe Leu Leu Val Leu Asp
            260   265   270
Asp Val Trp Asn Glu Asp Pro Val Lys Trp Glu Ser Leu Leu Ala Pro
            275   280   285
Leu Asp Ala Gly Gly Arg Gly Ser Val Val Ile Val Thr Thr Gln Ser
    290   295   300
Lys Lys Val Ala Asp Val Thr Gly Thr Met Glu Pro Tyr Val Leu Glu
305   310   315   320
Glu Leu Thr Glu Asp Asp Ser Trp Ser Leu Ile Glu Ser His Ser Phe
                325   330   335
Arg Glu Ala Ser Cys Ser Ser Thr Asn Pro Arg Met Glu Glu Ile Gly
            340   345   350
Arg Lys Ile Ala Lys Lys Ile Ser Gly Leu Pro Tyr Gly Ala Thr Ala
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Met Gly Arg Tyr Leu Arg Ser Lys His Gly Glu Ser Ser Trp Arg Glu
    370   375   380
Val Leu Glu Thr Glu Thr Trp Glu Met Pro Pro Ala Ala Ser Asp Val
385   390   395   400
Leu Ser Ala Leu Arg Arg Ser Tyr Asp Asn Leu Pro Pro Gln Leu Lys
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Leu Cys Phe Ala Phe Cys Ala Leu Phe Thr Lys Gly Tyr Arg Phe Arg
            420   425   430
Lys Asp Thr Leu Ile His Met Trp Ile Ala Gln Asn Leu Ile Gln Ser
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Thr Glu Ser Lys Arg Ser Glu Asp Met Ala Glu Glu Cys Phe Asp Asp
    450   455   460
Leu Val Cys Arg Phe Phe Arg Tyr Ser Trp Gly Asn Tyr Val Met
465   470   475   480
Asn Asp Ser Val His Asp Leu Ala Arg Trp Val Ser Leu Asp Glu Tyr
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Phe Arg Ala Asp Glu Asp Ser Pro Leu His Ile Ser Lys Pro Ile Arg
            500   505   510
His Leu Ser Trp Cys Ser Glu Arg Ile Thr Asn Val Leu Glu Asp Asn
        515   520   525
Asn Thr Gly Gly Asp Ala Val Asn Pro Leu Ser Ser Leu Arg Thr Leu
    530   535   540
Leu Phe Leu Gly Gln Ser Glu Phe Arg Ser Tyr His Leu Leu Asp Arg
545   550   555   560
Met Phe Arg Met Leu Ser Arg Ile Arg Val Leu Asp Phe Ser Asn Cys
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Val Ile Arg Asn Leu Pro Ser Ser Val Gly Asn Leu Lys His Leu Arg
            580   585   590
Tyr Leu Gly Leu Ser Asn Thr Arg Ile Gln Arg Leu Pro Glu Ser Val
        595   600   605
Thr Arg Leu Cys Leu Leu Gln Thr Leu Leu Leu Glu Gly Cys Glu Leu
    610   615   620
Cys Arg Leu Pro Arg Ser Met Ser Arg Leu Val Lys Leu Arg Gln Leu
625   630   635   640
Lys Ala Asn Pro Asp Val Ile Ala Asp Ile Ala Lys Val Gly Arg Leu
                645   650   655
Ile Glu Leu Gln Glu Leu Lys Ala Tyr Asn Val Asp Lys Lys Lys Gly
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                660                           665                           670
His Gly Ile Ala Glu Leu Ser Ala Met Asn Gln Leu His Gly Asp Leu
        675                   680                   685
Ser Ile Arg Asn Leu Gln Asn Val Glu Lys Thr Arg Glu Ser Arg Lys
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Ala Asp Gly Arg Gly Ala Gly Glu Cys Asp Arg Asp Arg Lys Val Leu
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Lys Gly Leu Arg Pro His Pro Asn Leu Arg Glu Leu Ser Ile Lys Tyr
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Tyr Gly Gly Thr Ser Ser Pro Ser Trp Met Thr Asp Gln Tyr Leu Pro
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Asn Met Glu Thr Ile Arg Leu Arg Ser Cys Ala Arg Leu Thr Glu Leu
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Pro Cys Leu Gly Gln Leu His Ile Leu Arg His Leu His Ile Asp Gly
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Met Ser Gln Val Arg Gln Ile Asn Leu Gln Phe Tyr Gly Thr Gly Glu
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Val Ser Gly Phe Pro Leu Leu Glu Leu Asn Ile Arg Arg Met Pro
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Ser Leu Glu Glu Trp Ser Glu Pro Arg Arg Asn Cys Cys Tyr Phe Pro
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Arg Leu His Lys Leu Leu Ile Glu Asp Cys Pro Arg Leu Arg Asn Leu
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Pro Ser Leu Pro Pro Thr Leu Glu Glu Leu Arg Ile Ser Arg Thr Gly
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Leu Val Asp Leu Pro Gly Phe His Gly Asn Gly Asp Val Thr Thr Asn
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Val Ser Leu Ser Ser Leu His Val Ser Glu Cys Arg Glu Leu Arg Ser
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Leu Ser Glu Gly Leu Leu Gln His Asn Leu Val Ala Leu Lys Thr Ala
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Arg Cys Asp Pro Pro Gly Gly Asp Asp Trp Pro Leu Ile Ala Asn Val
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225   230   235   240
Glu Xaa Trp Xaa Xaa Pro Xaa Ala Xaa Xaa Xaa Xaa Leu Xaa Xaa Leu
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Phe Cys Ala Xaa Phe Xaa Lys Xaa Tyr Xaa Phe Xaa Lys Xaa Xaa Leu
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